Stela Manova
University of Vienna
Kimberley Winternitz
University of Vienna

Suffix order in double and multiple diminutives: with data from Polish and Bulgarian[1]

Abstract
In this article we investigate suffix combinations in second- and third-grade diminutive nouns in Polish and Bulgarian. We show that the formation of double and multiple diminutives in both languages is subject to phonological, morphological, semantic and psycholinguistic constraints. Although diminutive suffixes constitute a semantically homogeneous set, they do not combine freely with each other and of all possible combinations of diminutive suffixes in a language only a very few exist. Both languages under scrutiny in this paper 'filter' their relatively large sets of DIM1 suffixes and use a very few of them for the formation of DIM2 nouns, and Bulgarian also for DIM3 nouns. Moreover, only suffixes that occur in DIM2 nouns can derive DIM3 nouns in Bulgarian. The combinations of diminutive suffixes in double and multiple diminutives are fixed and resemble to some extent a template order. The paper also contributes to morphological theory: to the proper understanding of diminutivization, to the definition of closing suffixation, and to revealing the way affix order is constrained in human languages.

Keywords:
affix order, constraints, derivation, diminutives, Polish, Bulgarian

Streszczenie
Porządek sufiksów w wielokrotnych zdrobnieniach: na materiale języka polskiego i bułgarskiego
Artykuł prezentuje opis kombinacji sufiksów występujących w deminutywach drugiego i trzeciego stopnia w języku polskim i bułgarskim. Wykazujemy w nim, że tworzenie deminutywów pierwszego i drugiego stopnia w obu językach zależy od czynników fonologicznych, morfologicznych, semantycznych i psycholingwistycznych. Spośród wielu hipotetycznych kombinacji sufiksów deminutywnych wykorzystywanych jest w rzeczywistości zaledwie kilka. Oba języki filtrują swoje względnie obszerne zasoby sufiksów DIM1 i używają bardzo niewielu z nich do tworzenia rzeczow-

[1] Parts of this article were presented at the *Workshop on recursiveness in word-formation* held at the *42nd Annual Meeting of the Societas Linguistica Europaea* in Lisbon, Portugal, in September 2009; the *37th Austrian Linguistics Meeting* that took place in Salzburg, Austria, in December 2009; and at the *5th Annual Meeting of the Slavic Linguistics Society (SLS)*, Chicago, IL, USA, October 2010. We thank the audiences of the three meetings for excellent comments. We are also grateful to Iwona Burkacka and Bogdan Szymanek for discussion on the nature of the unproductive diminutive suffixes in Polish. The usual disclaimers apply.
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ników DIM2 (w języku bułgarskim również do tworzenia rzeczowników DIM3). Ponadto tylko sufiksy pojawiające się w rzeczownikach DIM2 mogą derywować rzeczowniki DIM3. Kombinacje sufiksów w deminutywach pierwszego i drugiego stopnia są stałe i przypominają szablon. Artykuł jest przyczynkiem do teorii morfologicznej – do właściwego rozumienia procesów deminutywizacji, próbą ustalenia listy sufiksów kończących procesy derywacyjne i odkrycia zasad, które rządzą układem afiksów w językach naturalnych.

Słowa klucze:
kolejność afiksów, ograniczenia, derywacja, deminutywa, język polski, język bułgarski

1. Introduction

This article concentrates on the formal side of diminutivization rules and thus differs from the most studies on diminutives which focus on the semantic-pragmatic aspect of diminutive formations (to mention just a few studies: Dressler and Barbaresi 1994, and Jurafsky 1996 for diminutives in various languages; Wierzbicka 1984 and later work, and Kryk-Kastovsky 2000 for diminutives in Polish; and Radeva 1991, 2007, and Zidarova 2007 for diminutives in Bulgarian). We investigate the combinations of diminutive suffixes in double and multiple nominal diminutives in Polish and Bulgarian. Each of the two languages possesses a set of ten diminutivizing suffixes. Since diminutive suffixes are semantically homogenous, one might expect them to combine freely with each other. However, this is not the case. Only a few suffixes of the fairly large sets of diminutivizers in both Polish and Bulgarian can be used recursively. Thus, the main goal of this study is to detect the principles that constrain the combination of suffixes in double and multiple diminutives.

We define a noun as being a diminutive if it is morphologically complex (i.e. derived) and serves (primarily) for the expression of smallness. In other words, we see a diminutive suffix as a trigger of the semantic meaning 'smallness', which means that the semantics of a multiple diminutive chain is: (basic) NOUN → DIM1 'small NOUN' → DIM2 'small DIM1' → DIM3 'small DIM2', where DIM1 stands for a first-grade diminutive, DIM2 – for a second-grade diminutive, and DIM3 – for a third-grade diminutive. DIM1 nouns exhibit one diminutive suffix; DIM2 nouns have two diminutive suffixes (by default); and DIM3 nouns exhibit three diminutive suffixes. Therefore, we refer to DIM3 nouns as multiple diminutives. According to the definition of diminutives assumed here, we set apart expressives that are often derived by addition of diminutive suffixes, but as the term itself implies, serve for the expression of affection.

Following Manova & Aronoff (2010), we will speak of formal restrictions on the order of the diminutive suffixes if phonological and/or morphological information is responsible for the order of the suffixes; of semantic ordering if semantic information is of importance to suffix order; and of psycholinguistic ordering if information related to suffix productivity orders the diminutive suffixes.

This study can be seen as building on Szymanek and Derkach (2005), henceforth S&D (published in *Studies in Polish Linguistics* 2), who compare double diminutives

in Polish (West Slavic) and the closely related to it Ukrainian (East Slavic). With data from Bulgarian (South Slavic), we complement S&D's study typologically. The present paper, however, differs from S&D in a number of respects: 1) we focus on possible and existing suffix combinations whereas S&D's argument is primarily based on avoidance of repetition of identical morphs, a principle that is often violated in multiple diminutives; 2) we define both constraints on the derivational base and on the suffix attached, while S&D formulate only constraints on the base; 3) we consider also unproductive diminutive patterns, whereas S&D investigate only productive patterns; 4) we have examples of multiple diminutives (i.e. DIM3) from Bulgarian; and 5) we check the possible combinations of diminutive suffixes not only in dictionaries (as S&D do) but also on the Internet and in the corpora listed in the References. These facts explain why our set of constraints on dimunitvization in Polish differs from the constraints established by S&D.

The article is structured as follows. In section 2 we introduce the structure of the Slavic word and our theoretical assumptions. In section 3 the sources of data and the methodology followed are described. Section 4 is devoted to Polish diminutives. Section 5 discusses diminutivization in Bulgarian. Section 6 includes a general discussion. Conclusions are presented in section 7.

2. The structure of the Slavic word

The Slavic languages represent the inflecting-fusional morphological type, which means that they make a clear distinction between derivational and inflectional suffix slots (cf. Skalička 1979). Thus for the Slavic word we assume the following generalized structure which is based on the universal principle of constructional diagrammaticity in the sense of Natural Morphology (cf. Dressler et al. 1987), which claims that addition of semantics implies addition of form; and the notion of prototype of Cognitive Grammar (cf. Langacker 1987), according to which the easiest way of accessing a phenomenon is via that manifestation of it that is most salient. The structure in question is (cf. Manova 2002, 2010b):

(1) (PREFIX)-BASE-(DERIVATIONAL SUFF)-(THEMATIC MARKER)-(INFLECTIONAL SUFF)

As indicated by the brackets, the slot BASE is always occupied, whereas the other slots may be empty. Additionally, the BASE can be a root, a stem or a word. Prototypically, derivation takes place in the derivational slot of the word, whereas inflection operates in the inflectional slot. Thematic markers are assumed only in verbal morphology where they have inflectional status (cf. the discussion in: Manova 2005). In other words, since we only analyze basic (non-diminutive nouns), word-class preserving derivations from them, the thematic marker slot is irrelevant to us. Furthermore, as diminutives are derived exclusively via suffixation, we will not consider the prefix slot either. Thus, the structure we will use for the analysis is:

(2) BASE-DERIVATIONAL SUFF-INFLECTIONAL SUFF

Additional, purely grammatical, motivation for the differentiation of derivational and inflectional word slots in Slavic languages is provided in Manova (2010a), where it is claimed that derivation and inflection should be distinguished because they behave differently with respect to further suffixation. We will illustrate her claim with the following examples from Polish that are derived with the homophonous suffixes *-k$_1$-a* (3a) and *-k$_2$-a* (3b). We would like to underline here that our analysis is word-based (Aronoff 1976, Booij 2010, among others) and we therefore consider the derivational suffix and the inflection that follows it together. However, in contrast to Aronoff's and Booij's word-based morphology, we believe that not only words but also affixes can be associated with particular semantics. Thus, the suffix *-k$_1$-a* (3a) derives names of objects from verbal bases, while the suffix *-k$_2$-a* (3b) is used for the formation of nouns denoting female humans from nouns for male humans. In the below all a instances to examples *-k$_1$-a* and the b. instances to *-k$_2$-a*.

(3) a. *kołys-ać* 'to swing'→ N FEM *kołys-k$_1$-a* 'cradle'
b. *trener* 'coach → N FEM *trener-k$_2$-a* 'female coach'

The next two paradigms give all possible inflectional forms of *kołys-k$_1$-a* and *trener-k$_2$-a*:

(4) a.

SG	PL
NOM *kołys-k$_1$-a*	*kołys-k$_1$-i*
GEN *kołys-k$_1$-i*	*kołys-ek$_1$-ø*
DAT *kołys-c$_1$-e*	*kołys-k$_1$-om*
ACC *kołys-k$_1$-ę*	*kołys-k$_1$-i*
INST *kołys-k$_1$-ą*	*kołys-k$_1$-ami*
LOC *kołys-c$_1$-e*	*kołys-k$_1$-ach*
VOC *kołys-k$_1$-o*	*kołys-k$_1$-i*

b.

NOM *trener-k$_2$-a*	*trener-k$_2$-i*
GEN *trener-k$_2$-i*	*trener-ek$_2$-ø*
DAT *trener-c$_2$-e*	*trener-k$_2$-om*
ACC *trener-k$_2$-ę*	*trener-k$_2$-i*
INST *trener-k$_2$-ą*	*trener-k$_2$-ami*
LOC *trener-c$_2$-e*	*trener-k$_2$-ach*
VOC *trener-k$_2$-o*	*trener-k$_2$-i*

Similar cases from Bulgarian are: *snim-k$_1$-a* 'a photograph' → DEF *snim-k$_1$-a-ta* , PL *snim-k$_1$-i*, PL DEF *snim-k$_1$-i-te* and *professor-k$_2$-a* → DEF *professor-k$_2$-a-ta*, PL *professor-k$_2$-i*, PL DEF *professor-k$_2$-i-te* (Manova 2010). As can be seen from these Bulgarian examples and the Polish paradigms provided in (4) above, nouns that exhibit homophonous derivational suffixes receive the same inflection. Thus, we will conclude

that inflectional morphology does not distinguish between homophonous derivational suffixes.[2] This is in contrast to derivational morphology. (5a) and (5b) illustrate all possible further derivations from the bases terminating in *-k_1-a* and *-k_2-a* in Polish:

(5) a. *kołys-k_1-a* 'cradle' → ADJ *kołys-k_1-ow-y* 'cradle-'
kołys-k_1-a 'cradle' → DIM *kołys-ecz$_1$-k-a*

b. *trener-k_2-a* 'female trainer' → ADJ ø
trener-k_2-a 'female trainer' → DIM ø

Remarkably, for derivational morphology *-k_1-a* and *-k_2-a* are two different suffixes: the suffix *-k_1-a* allows attachment of further derivational suffixes (5a), whereas the suffix *-k_2-a* does not, i.e. it is closing, which means that it cannot be followed by another suffix of the same type.[3] As can be expected, Bulgarian derivational morphology also distinguishes between homophonous derivational suffixes in the way the Polish derivational morphology does for *-k_1-a* and *-k_2-a* above, as shown in Manova (2010).

Thus, since inflection and derivation behave differently with respect to further suffixation, they both should have rules of their own. Put differently, the distinction between derivation and inflection is of importance for the proper functioning of morphological rules. With respect to word structure, derivation and inflection should have their own (i.e. different) domains (slots) of operation.

In view of the above, diminutives derived by attachment of inflection only, such as the Bulgarian *petel* 'cock' → DIM *petl-e*, *vojnik* 'soldier' → *vojnič-e* and the Polish *kot* 'cat' → DIM *koci-ę*, will not be considered in this study. We see such forms as 'inflectional diminutives' (Manova 2005).

While a Bulgarian noun can have more than one suffix in the derivational and inflectional slots (e.g. *drug-ar-stv-o-to* 'comradeship-the = the comradeship', *comrade-*DSUFF-DSUFF-ISUFF-ISUFF), a Polish noun can have more than one derivational suffix, but never exhibits more than one inflectional suffix. This language specific structural difference between Polish and Bulgarian is due to the fact that Bulgarian has a suffixed definite article (the morpheme *-to* in the above cited *drugarstvoto* 'the comradeship') whereas Polish does not have a morphological marker for definiteness.

A diminutive suffix is always in the derivational slot of the noun and either follows another derivational suffix, as in P. *blond-yn* 'blond man'→ DIM *blond-yn-ek* (*-yn* is a derivational suffix and *-ek* is a diminutive suffix), or it is directly attached to a non-derived base, as in P. *kwiat* 'flower' → DIM *kwiat-ek*. In the case of double

[2] Our analysis is word-based and we differ from phonological studies such as Gussmann (2007) who treats the suffixes *-ek -ik/-yk, -ka* and *-ko* as variants of the same derivational suffix, i.e. as allomorphs with the underlying form *-(V)k-*. In our framework, these suffixes are associated with different inflectional paradigms and are thus different derivational suffixes.

[3] On closing suffixes in Slavic languages, especially in derivations of female humans from male humans, see Manova 2008, 2009. A closing suffix is a suffix that cannot be followed by another suffix of the same type, i.e. a closing derivational suffix cannot be followed by another derivational suffix and a closing inflectional suffix cannot be followed by another inflectional suffix.

diminutives, two diminutive suffixes are placed in the derivational slot, e.g. *kwiat* 'flower' → DIM1 *kwiat-ek* → DIM2 *kwiat-eč-ek*, with a *k:č* palatalization in DIM2.

3. Data and method

As regards the data, we have consulted the following dictionaries and corpora. For Polish: Doroszewski (1997), the electronic version of *Słownik Języka Polskiego* (SJP); Dubisz (2008), the electronic version of *Uniwersalny Słownik Języka Polskiego* (USJP); Saloni (2007), the electronic version of *Słownik Gramatyczny Języka Polskiego* (SGJP); Jadacka's (2001) *Słownik gniazd słowotwórczych współczesnego języka polskiego* (SGSWJP); *the Polish National Corpus*. For Bulgarian: Stankov et al. 2002, *New Spelling Dictionary of Modern Bulgarian*; Andrejčin (1978), *Reverse Dictionary of Modern Bulgarian*, and *the Bulgarian National Corpus*. However, since diminutives are typical of colloquial style and extremely productive in Polish and Bulgarian, they are often not listed in dictionaries and are not well represented in corpora since the latter are based mainly on written texts. This makes the verification of diminutive forms, and especially of multiple diminutives, a challenging task. Thus, in order to gain completeness and objectiveness, we have additionally consulted native speakers and the Internet. However, since native speakers of Polish and Bulgarian often provide controversial judgments as to whether a particular diminutive exists or not, we have decided to consider as existing only diminutives that are listed in one of the above cited sources as well as in other printed materials and electronic corpora, or available on the Internet. One occurrence on the Internet is seen as evidence that the diminutive exists, though in most of the cases there is more than one example. In sum, all diminutives cited in this article are verified by some source, be it a written source, electronic corpus or the Internet.

For the analysis, we distribute the diminutive suffixes into two groups according to the length of the suffix, i.e. we distinguish between long and short suffixes. We define long suffixes as suffixes that consist of two syllables, and refer to monosyllabic suffixes as 'short suffixes'. This classification of suffixes follows Rice (2011), who demonstrates the relevance of affix length to affix ordering in Athapascan languages. It should also be noted that suffix length in Polish coincides with suffix productivity, i.e. in Polish short suffixes are productive, whereas long suffixes are unproductive.

As for the selection and description of the data, the latter were collected for the project *(De)composing the Slavic Word* (grant V64-G03 from the Austrian Science Fund (FWF)). In the project data sets, every derivational suffix is specified semantically (i.e. its semantics is considered), syntactically (with respect to syntactic category), morphologically (with respect to the type of bases the suffix attaches to and the suffixes that can follow this suffix), and (morpho)phonologically ((morpho)phonological alternations caused by the suffix, e.g. stress change, palatalizations, etc.). Additionally, we control the way a suffix attaches, whether by addition or substitution. The bases, which may be words, stems and roots, are also fully specified (syntactically, semantically, morphologically, and phonologically) in our description.

For the purposes of this study, we extracted the complete lists of Polish and Bulgarian diminutive suffixes (productive and non-productive) from the project data. The diminutive suffixes in both languages are those recognized by the respective academic reference grammars: Andrejčin et al. (1983) for Bulgarian and Grzegorczykowa et al. (1984, 1998) for Polish. Other sources consulted are: Długosz (2009) for Polish; Radeva (1991, 2007) and Stojanov (1994) for Bulgarian as well as research articles on diminutive formation in both languages listed in the references. With the help of the lists of the diminutive suffixes, we check which of the possible suffix combinations exist (i.e. we combine the diminutive suffixes with each other and check which combinations are used in one of the sources considered and on the Internet as well as by the consulted native speakers).

4. Polish diminutives

Diminutivization is extremely productive in Polish. The majority of the nouns can be diminutivized and some of the DIM1 nouns can be further diminutivized, giving DIM2 nouns. Let us first review the formation of the DIM1 nouns.

4.1. First-grade diminutives (DIM1) in Polish

Polish possesses ten suffixes for derivation of DIM1 nouns, i.e. suffixes that attach to basic nouns: *-ik / -yk, -ek, -uszek, -iszek / -yszek, -aszek, -ka*[4]*, -uszka, -iczka*[5] */ -yczka, -ko* and *-uszko*.[6]

The selection of the suffix depends on phonology by default and is also alliterative. Basic nouns terminating in a consonant select a diminutive suffix that also terminates in *-C*, as illustrated in (6):

(6)

a. *regał* 'bookshelf' → DIM1 *regal-ik*
b. *talerz* 'plate' → DIM1 *talerz-yk*
c. *szlafrok* 'bathrobe' → DIM1 *szlafrocz-ek*
d. *dzban-ek* 'jug' → DIM1 *dzban-uszek*
e. *brat* 'brother' → DIM1 *brac-iszek*
f. *chłopi-ec* 'boy' → DIM1 *chłop-yszek*
g. *kij* 'stick' → DIM1 *kij-aszek*

Basic nouns terminating in *-a* select suffixes terminating in *-a*:

[4] In Table 1 and Table 3, we distinguish between a productive suffix *-ka* that attaches to nouns terminating in *-a* and an unproductive *-ka* that attaches to feminine nouns in *-C*. Thus, strictly speaking, the number of DIM1 suffixes is eleven. However, only the productive suffix *-ka* is relevant to us, since the unproductive *-ka* does not allow further attachment of suffixes.

[5] In Grzegorczykowa et al (1984, 1998), the existence of the allomorph *-iczka* seems to be assumed by analogy to the other suffix allomorphs. However, no example is given in the grammar and we could not find any either.

[6] The diminutive suffixes we acknowledge are those listed in the Grzegorczykowa et al (1984, 1998). Długosz (2009) has 27 diminutivizers in Polish, some of them, however, pose strange restrictions on the base, e.g. attach only to plural bases, whereas others express affection rather than smallness, a fact noted by Długosz herself.

(7)

a. *rura* 'pipe' → DIM1 *rur-ka*
b. *siostra* 'sister' → DIM1 *siostrz-yczka*
c. *brycz-ka* 'sulky' → DIM1 *brycz-uszka*

Basic nouns terminating in *-o* or *-e* select diminutive suffixes in *-o*:

(8)

a. *wiadro* 'bucket' → DIM1 *wiader-ko*
b. *śniadanie* 'breakfast' → DIM1 *śniadan-ko*
d. *jabł-ko* 'apple' → DIM1 *jabł-uszko*

The above distribution of the nouns into terminating in *-C*, *-a*, *-o* or *-e* largely coincides with gender, in the sense that nouns terminating in *-C* are masculine by default, nouns in *-a* are feminine by default, and nouns in *-o* and *-e* are neuter by default. The most notable exception of these phonological rules represent nouns in *-C* which are feminine. Note, however, that most of the feminines in *-C* are morphologically marked since they are derived by the suffix *-ość*. Feminine nouns in *-C* select diminutive suffixes depending not on phonology but on gender. In other words, feminines in *-C* take the suffix *-ka* that is the default suffix for feminines, e.g.: *wiadomość* 'news' → DIM1 *wiadomost-ka*.[7]

Finally, since there are two productive suffixes for diminutivization of masculine nouns terminating in *-C*, *-ik* / *-yk* and *-ek*, the former with two allomorphs, more specific phonological rules govern the selection of the diminutive suffix when a noun terminates in *-C*. Bases in a velar consonant (*k, g, x*) and *r*, except the combination *-Cr*, are followed by *-ek* (9); bases terminating in the consonants *cz, ż, c, dz,* and *rz* select *-yk* (10); bases ending in *sz, j, n, ń, d, dź,* and *s* take *-ik* (11):

(9)

a. *bąk* 'bumblebee' → DIM1 *bączek*[8]
b. *próg* 'door step' → DIM1 *proż-ek*
c. *fartuch* 'apron' → DIM1 *fartusz-ek*
d. *kufer* 'chest' → DIM1 *kufer-ek*
e. *rejestr* 'register' → DIM1 *rejestrz-yk* (cf. (5))

(10)

a. *klucz* 'key' → DIM1 *klucz-yk*
b. *jeż* 'hedgehog' → DIM1 *jeż-yk*
c. *koc* 'blanket' → DIM1 *koc-yk*
d. *rydz* 'mushroom/Saffron milk cap' → DIM1 *rydz-yk*
e. *talerz* 'plate' → DIM1 *talerz-yk*

[7] The suffix *-ość* usually derives abstract nouns, the latter, due to their semantics, do not or seldom diminutivize.

[8] The only exception found is *hak* 'hook' → DIM1 *hacz-yk.*

(11)

a. *arkusz* 'sheet' → DIM1 *arkus-ik*
b. *kraj* 'country' → DIM1 *kra-ik*
c. *tapczan* 'couch' → DIM1 *tapczan-ik*
d. *koń* 'horse' → DIM1 *kon-ik*
e. *wodospad* 'waterfall' → DIM1 *wodospadz-ik*
f. *śledź* 'herring' → DIM1 *śledz-ik*
h. *proces* 'process' → DIM1 *proces-ik*

Finally, there is a residue, comprising nouns terminating in *-C*, for which it is difficult to establish a preference for a particular suffix. Such nouns either allow the attachment of both *-ik* and *-ek*, as illustrated in (12) (see also Kreja 1989), or exhibit inexplicable preference for one of the two suffixes, as shown in (13), where the two nouns *fotel* 'armchair' and *rondel* 'pan' terminate in the same way but select different diminutive suffixes:

(12)

a. *chlew* 'pigsty' → DIM1 *chlew-ek*
and
b. *chlew* 'pigsty' → DIM1 *chlew-ik*

(13)

a. *fotel* 'armchair' → DIM1 *fotel-ik*
b. *rondel* 'pan' → DIM1 *rondel-ek*

As mentioned above, there are productive (short, i.e. monosyllabic) and unproductive (long, i.e. disyllabic)[9] diminutive suffixes. The distribution of the two types of suffixes can be seen as depending also on phonology. If a base noun terminates in a sequence homophonous with one of the short DIM1 suffixes, a long DIM1 suffix, selected phonologically, substitutes the suffix in the base noun,[10] as shown in the following examples:

(14)

a. *dzban-ek* 'jug' → DIM1 *dzban-uszek*
b. *brycz-ka* 'sulky' → DIM1 *brycz-uszka*
c. *jabł-ko* 'apple' → DIM1 *jabł-uszko*

The above phonological rules are summarized in table 1.

[9] The only exception is the unproductive suffix *-ka*. This suffix is, however, of no interest to us, since it attaches to a very limited number of nouns (non-derived feminine nouns in -C and seldom to *-ość* nouns mentioned in footnote 7) and does not participate in combinations with other diminutive suffixes (cf. Table 3).

[10] The basic nouns were diminutives diachronically. In Modern Polish, however, they are not associated with any diminutive semantics.

Tab. 1. DIM1 suffixes in Polish

Nouns in	Productive DIM1 suffix	Unproductive DIM1 suffix
-C	*-ik* / *-yk*	*-uszek*
	-ek	*-iszek* / *-yszek*
		-aszek
		-ka[11] (attaches to feminine nouns)
-a[12]	*-ka*	*-uszka*
		-yczka
-o / -e	*-ko*	*-uszko*

4.2. Second-grade diminutives (DIM2) in Polish

Let us turn now to the formation of DIM2 nouns.

The phonological rules we introduced above for the attachment of DIM1 suffixes apply to the formation of second-grade diminutives, too. DIM1 nouns terminating in *-C*, i.e. in *-ik*/*-yk* and *-ek*, receive the DIM2 suffix *-ek*:

(15)

a. DIM1 *stol-ik* 'small table' → DIM2 *stol-icz-ek*
b. DIM1 *kosz-yk* 'small basket' → DIM2 *kosz-ycz-ek*
c. DIM1 *dom-ek* 'small house' → DIM2 *dom-ecz-ek*

These examples are consonant with the more specific phonological rule formulated for the formation of DIM1 nouns above, namely that bases in a velar consonant always select the diminutive suffix *-ek* (cf. 9).[13]

Additionally, there are two unproductive suffixes that appear in DIM2 nouns derived from DIM1 in *-C*. Consider the following:

(16) DIM1 *kłęb-ek* 'small billow' → DIM2 *kłęb-uszek*
DIM1 *kij-ek* 'small stick' → DIM2 *kij-aszek*.

However, it should be stressed that unproductive suffixes are seldom used as DIM2 suffixes. Moreover, unlike the productive suffixes, which always attach by addition, the unproductive suffixes can be seen as attaching by substitution, where the DIM1 suffix is substituted by the unproductive suffix. Thus, since all diminutives, irrespec-

[11] We distinguish between the DIM1 suffix *-ka* that attaches to feminine nouns in -C and is unproductive and the productive DIM1 *-ka* that attaches to feminine nouns in *-a*. This differentiation of the two DIM1 suffixes *-ka* is also due to the fact that in Bulgarian feminine nouns in -C have a DIM1 suffix of their own. Thus, in order to have a uniform analysis, we set the feminine nouns in -C apart from all other nouns in both languages.

[12] Nouns such as *tata* 'dad', with the derivative *tatek*, are not considered because *tatek* does not mean 'small dad', i.e. is not a DIM1 noun.

[13] DIM2 nouns derived by unproductive DIM1 suffixes in *-C* are rare and also follow the phonological rule that requires nouns terminating in a velar consonant to select the diminutive suffix *-ek*: DIM1 *garn-uszek* 'small pot' → DIM2 *garn-uszecz-ek.*

tive of whether DIM1 or DIM2, are derived by addition of a suffix, the unproductive DIM2 nouns appear to be system-inadequate. Further evidence for this conclusion provides the description of the unproductive DIM2 nouns in the literature. Some authors understand them as derived through infixation and assume the existence of intermorphs (Kallas 2009: 172, 175), whereas others speak of amplifying formants "formanty rozszerzone" (e.g. Grzegorczykowa 1979: 165) or "formanty komponowane" (Grabias 1981: 75), still others treat them as being interfixed, but don't classify the formation explicitly (Jadacka 2001).

All DIM1 nouns terminating in the productive DIM1 suffix *–ka* select *-ka* as a DIM2 suffix:

(17)
a. DIM1 *ram-ka* 'small frame' → DIM2 *ram-ecz-ka*
b. DIM1 *szuflad-ka* 'small drawer' → DIM2 *szuflad-ecz-ka*

DIM1 nouns terminating in the productive DIM1 suffix *-ko*, get *-ko* as a DIM2 suffix too:

(18)
a. DIM1 *sit-ko* 'small sieve' → DIM2 *sit-ecz-ko*
b. DIM1 *śniadan-ko* 'small breakfast' → DIM2 *śniadan-ecz-ko*

The unproductive DIM1 suffixes terminating in *-a* and *-o*, such as *-uszka*, *-yczka* and *-uszko*, do not participate in combinations with other diminutive suffixes.

The rules for derivation of DIM2 nouns in Polish are summarized in Table 2:

Tab. 2. DIM2 suffixes in Polish

DIM 1 suffix	Productive DIM2 suffixes (attach by addition)	Unproductive DIM2 suffixes (attach by substitution, i.e. do not combine with DIM1 suffixes)
-Vk	*-ek*	*-uszek* *-aszek*
-ka	*-ka*	
-ko	*-ko*	

As demonstrated in Table 2 above, only three of the ten DIM1 suffixes can be used as DIM2 suffixes productively. Table 3 lists all Polish diminutive suffixes and their combinations:

Tab. 3. Combinability of DIM suffixes in Polish

	DIM1 suffixes	DIM2 suffixes	
Nouns in		Productive (attach by additon)	Unproductive (attach by substitution of a DIM1 suffix, i.e. do not combine with DIM1 suffixes)
-C	*-ek* *-ik* / *-yk* *-uszek* (unproductive)	*-ek*	*-uszek*, *-aszek*
	-iszek /*-yszek* (unproductive) *-aszek* (unproductive) *-ulek* (unproductive) *-ka* (unproductive, selects feminine nouns)		
-a	*-ka*	*-ka*	
	-uszka (unproductive) *-iczka* /*-yczka* (unproductive)		
-o / *-e*	*-ko*	*-ko*	
	-uszko (unproductive)		

4.3. Constraints on the derivation of DIM2 nouns

As demonstrated above, the formation of DIM2 nouns is heavily constrained. Four different types of rules apply – two formal (phonological and morphological), one semantic, and one psycholinguistic.

4.3.1. Phonological constraints

4.3.1.1. Constraint on the base

Basic (i.e. non-diminutive) nouns ending in a velar consonant (*k*, *g*, *x*), DIM1 in *-ek*, often lack DIM2 forms, e.g.:

(19) *ćwiek* 'nail'→ DIM1 *ćwiecz-ek* → DIM2 **ćwiecz-ecz-ek*.

It should be noted, however, that this constraint is not absolute and S&D who formulate it as a rule without exceptions have a counter example in the Appendix to their own paper: *kielich* 'glass' → DIM1 *kielisz-ek* → DIM2 *kielisz-ecz-ek* (p.109). In other cases S&D do not give a DIM2 for nouns terminating in a velar consonant, but the DIM2 exists. For example:

(20)

a. *byk* 'bull' → DIM1 *bycz-ek* → DIM2 *bycz-ecz-ek* (found on the Internet)
b. *krąg* 'circle' → DIM1 *krąż-ek* → DIM2 *krąż-ecz-ek* (found in SGJP and SJP)
c. *brzeg* 'edge' → DIM1 *bryeż-ek* → DIM2 *brzeż-ecz-ek* (found in SGJP and SJP)

4.3.1.2. Constraints on the suffix

The base and the suffix rime: DIM1 nouns terminating in *-Vk* take the DIM2 suffix *-ek* (i.e. also terminating in *-Vk*); DIM1 nouns in *-ka* select the diminutivizer *-ka*; DIM1 nouns in *-ko* take the diminutive suffix *-ko*.

The number of the syllables of the diminutive suffix also appears relevant to DIM2 formation. Only a monosyllabic suffix can follow a DIM1 suffix in a DIM2 noun. Recall that disyllabic suffixes rarely form DIM2 nouns and, in addition, always replace the DIM1 suffix, thus the disyllabic suffixes do not participate in combinations with other diminutive suffixes.

4.3.2. Morphological constraints

4.3.2.1. On the base

The basic noun should be either monosyllabic or morphologically simple, i.e. DIM2 nouns from disyllabic and polysyllabic base forms are possible but rare.

4.3.2.2. On the suffix

Only particular suffixes can appear in DIM2 nouns and the combinations of the diminutive suffixes are morphologically fixed (cf. Table 3).

4.3.3. Semantic constraints

4.3.3.1. On the base

The basic noun should be countable, non-abstract and non-personal (S&D; Grzegorczykowa 1999: 425). This constraint is illustrated in (21) and (22) below.

(21)

a. *ulecz-ać* 'to recover' → *ulecz-anie* 'recovery' → **ulecz-an-ko*
b. *blady* 'pale' → *blad-ość* 'paleness' → **blad-ost-ka*

Lexicalized abstract nouns that denote countable objects diminutivize:

(22)

mieszkać 'to live (in an appartment)' → *mieszk-anie* 'living'/
'appartment' → DIM1 *mieszkan-ko* 'small appartment'
but DIM1 **mieszkan-ko* 'small living'

4.3.3.2. On the suffix

No semantic constraint operates on the suffix because all diminutive suffixes have the same semantics.

4.3.4. Psycholinguistic constraints

Only productive suffixes occur in double diminutives. The two unproductive suffixes that can be used for derivation of DIM2 nouns attach by substitution.

5. Bulgarian noun diminutives

5.1. DIM1 nouns

Modern Bulgarian possesses ten DIM1 suffixes: *-ec, -le, -če, -ka, -ica, -ička, -čica, -ce, -ice* and *-ence.* The suffix selection is phonological but not always alliterative.[14] Nouns terminating in *-C* take the suffixes *-ec*, *-le* and *-če* to form DIM1. This is illustrated with the following examples:

(23)
a. *vjatăr* 'wind' → DIM1 *vetr-ec*
b. *nos* 'nose' → DIM1 *nos-le*
c. *prăst* 'finger' → DIM1 *prăst-če*

Of the three suffixes only *-če* is productive and can also attach to derived bases, e.g.:

(24)
a. *pisa-tel* 'writer' → DIM1 *pisa-tel-če*
b. *drug-ar* 'camarade' → DIM1 *drug-ar-če*

Nouns terminating in *-a* combine with the following DIM1 suffixes*, -ka*, *-ica* and *-ička.* The attachment of the three suffixes is illustrated in (25):

(25)
a. *kniga* 'book' → DIM1 *kniž-ka*
b. *răka* 'hand'→ DIM *răč-ica*
c. *čanta* → DIM1 *čant-ička* (**čant-ica*)

Very few nouns in *-a* allow alternative DIM1 diminutives derived with two different suffixes, e.g.: *kniga* → DIM1 *kniž-ka* (lexicalized in *šof'orska knižka* 'driving licence', *studentska knižka* 'student book', etc.) and the more archaic *kniga* → DIM1 *kniž-ica*.

Nouns in *-o* and *-e* diminutivize through the attachment of the following DIM1 suffixes: *-ce, -ice,* and *-ence*. These suffixes are in complementary distribution in the sense that nouns in *-o* take *-ce* by default (26a), nouns in *-e* take the productive *-ence* by default (26b), and very few nouns in *-o* and *-e* select the unproductive suffix *-ice* (26c).

(26)
a. *krilo* 'wing' → DIM1 *kril-ce*
b. *tele* 'calf' → DIM1 *tel-ence*
c. *lice* 'face' → DIM1 *lič-ice* (unproductive pattern)

[14] Like for Polish, we follow Andrejčin et al. (1983) and differ from Długosz (2009).

The productive -ce and the unproductive -ice (26c) compete for the expression of DIM1 in cases such as *mljako* 'milk' → DIM1 *mleč-ice* and *mlek-ce*.

In Bulgarian, like in Polish, nouns terminating in *-C* are masculine by default, nouns in *-a* are feminine by default, and nouns terminating in *-o*/*-e* are neuter by default. However, in contrast to Polish, Bulgarian DIM1 suffixes can be gender-changing, and masculine nouns which take DIM1 suffixes in *-e* have DIM1 forms that are neuter. In Bulgarian, like in Polish, there are feminine nouns in *-C*. However, such nouns have a DIM1 suffix of their own, namely *-čica* (see Table 4), the latter is gender-preserving (27) but does not combine with feminine bases in *–a*, which thus constitutes a difference in comparison with Polish (cf. Table 1):

(27)

a. FEM *sol* 'salt' → DIM1 FEM *sol-čica*
b. FEM *radost* 'joy' → DIM1 FEM *radost-čica*

Tab. 4. DIM1 suffixes in Bulgarian

Nouns	DIM1 suffixes
in *-C*	*-ec* (unproductive) *-le* (unproductive, gender-changing) *-če* (productive, gender-changing) *-čica* (unproductive, attaches to feminine nouns)
in -a	*-ica* *-ka* *-ička*
in *-o*	*-ce*
in *-e*	*-ence* *-ice* (unproductive)

5.2. DIM2 nouns

The rules involved in the formation of DIM2 nouns in Bulgarian are more complex than in Polish. In Bulgarian, DIM1 nouns that terminate in *-C*, i.e. those formed with the suffix *-ec*, are never followed by another DIM suffix. In other words, DIM1 nouns in *-ec* do not have DIM2 forms.[15]

DIM1 nouns in *-a*, except those derived with the unproductive suffixes *-čica* and *-ička*, select either *-ka* or *-ica* as a DIM2 suffix. The rule is complementary and ensures that identical morphs are not repeated, i.e. nouns in *-ka* take *-ica*, whereas nouns in *-ica* select *-ka*, as illustrated below:

[15] The Bulgarian Academy Grammar (1998: 76) sees the suffix *-ec* as being expressive and diminutive at the same time, with the first function being the dominant one. It could be the explanation of why the suffix *-ec* does not allow the attachment of other diminutive suffixes. Note that our example in (23a) is a DIM1 noun.

(28)

a. (*răka* 'hand' →) DIM1 *răč-ica* → DIM2 *răč-ič-ka*
b. (*kniga* 'book' →) DIM1 *kniž-ka* → DIM2 *kniž-č-ica*

The rule of suffix ordering illustrated in (28) results in suffix permutation, i.e. AB and BA order of suffixes.[16]

DIM1 suffixes such as *-ička* and *-čica* which coincide with a combination of two diminutive suffixes (*-ica* + *-ka* → *-ička* and *-ka* + *-ica* → *-čica*) cannot be followed by DIM2 suffixes. All DIM1 suffixes in *–e*, i.e. *-le*, *-če*, *-ce, -ice* and *-ence*, are always followed by *-ence*:

(29)

a. (*nos* 'nose' →) DIM1 *nos-le* → DIM2 *nos-l-ence*
b. (*krăg* 'circle' →) DIM1 *krăg-če* → DIM2 *krăg-č-ence*
c. (*drug-ar* 'friend' →) DIM1 *drugar-če* → DIM2 *drugar-č-ence*
d. (*pisa-tel* 'writer' → DIM1) *pisatel-če* → DIM2 *pisatel-č-ence*[17]
e. (*mljako* 'milk' →) DIM1 *mlek-ce* → DIM2 *mlek-c-ence*
f. (*lice* 'face' →) DIM1 *lič-ice* → DIM2 *lič-ic-ence*
g. (*dete* 'child' →) DIM1 *det-ence* → DIM2 *det-enc-ence*

5.3. DIM3 nouns[18]

It should be mentioned that not all native speakers use this stage of diminutivization. Dictionaries and corpora do not register such forms, either. Of the different potential forms, we will give a few that were verified with the help of the Internet: 1) *-ka* + *-ica* + *-ica* → *-ič-ič-ica*, as in:

(30)

b. (*răka* 'hand' →) DIM1 *răč-ica* →
→ DIM2 *răč-ič-ka* →
→ DIM3 *răč-ič-ič-ica*
c. (*bluza*, blouse' →) DIM1 *bluz-ka* →
→ DIM2 *bluz-č-ica* →
→ DIM3 *bluz-č-ič-ica*

[16] For similar cases with non-diminutive derivational suffixes in Bulgarian, see Manova (2010a).

[17] Found on the Internet 7 times, search result as of 18.08. 2010.

[18] DIM3 nouns are also possible in Polish. However, according to native speakers' judgements, DIM3 nouns are less acceptable in Polish than in Bulgarian. Therefore, we do not have a section on Polish DIM3 nouns. We could find the following Polish DIM3 nouns on the Internet (used more than once): *dom* 'house' → DIM1 *dom-ek* → DIM2 *dom-ecz-ek* → DIM3 *dom-ecz-ecz-ek*, *ryba* 'fish' → DIM1 *ryb-ka* → DIM2 *ryb-ecz-ka* → DIM3 *ryb-ecz-ecz-ka*, *koło* 'wheel' → DIM1 *kół-ko* → DIM2 *kół-ecz-ko* → DIM3 *kół-ecz-ecz-ko*. As can be seen from these examples, the suffixes used for the derivation of DIM2 nouns (see Table 2) can also derive DIM3 nouns.

For DIM2 in *-e*: DIM1 + *-ence* + *ence*, as in:

(31)

a. *dete* 'child' → DIM1 *det-ence* →
→ DIM2 *det-enc-ence* →
→ DIM3 *det-enc-enc-ence*

b. *nos* 'nose' → DIM1 *nos-le* →
→ DIM2 *nos-l-ence* →
→ DIM3 *nos-l-enc-ence*

As these examples show, only DIM1 suffixes that are used as DIM2 occur in DIM3 nouns. Of the three DIM2 suffixes, only two, *-ica* and *-ence*, derive third-grade diminutives. Surprisingly, since the DIM3 *-ica* follows the DIM2 *-ica* and the DIM3 *-ence* attaches to the DIM2 *-ence*, the addition of both DIM3 suffixes requires repetition of identical morphs. Table 5 gives the existing combinations of diminutive suffixes in Bulgarian.

Tab. 5. Combinability of the DIM suffixes in Bulgarian

Nouns in	DIM1 suffixes	DIM2 suffixes	DIM3 suffixes
in *-C*	*-ec* (unproductive)		
	-le (unproductive) *-če*	*-ence*	*-ence*
	-čica (unproductive)		
in *-a*	*-ica*	*-ka*	
	-ka	*-ica*	*-ica*
	-ička (unproductive)		
in *-o*	*-ce*	*-ence*	*-ence*
in *-e*	*-ence* *-ice* (unproductive)		

5.4. Constraints on the formation of DIM2 and DIM3 nouns in Bulgarian

In Bulgarian the following constraints on the formation of diminutives hold (like in the description of the Polish diminutives, the constraints are defined as operating on either bases or suffixes):

5.4.1. Phonological constraints

Simple basic nouns in *-e* are the type of base easiest to diminutivize three times, though in Bulgarian no general phonological constraint operates on the basic noun. In contrast, there are phonological constraints on the suffix that attaches to a DIM1

or a DIM2 noun. DIM2 and DIM3 suffixes have to terminate in the same way as the bases to which they attach: DIM1 and DIM2 nouns in *-e* require a diminutive suffix in *-e*, namely *-ence*; DIM1 and DIM2 nouns in *-a* combine only with a diminutive suffix in *-a*, either *-ica* or *-ka*. In addition, DIM2 suffixes tend to be phonologically long, i.e. disyllabic, whereas DIM3 suffixes are always disyllabic.

5.4.2. Morphological constraint

The basic noun is free of morphological constraints. However, the diminutive suffixes in double and multiple diminutives occur in fixed combinations (cf. Table 5).

5.4.3. Semantic constraint

As regards the bases, countable concrete nouns and nouns for offsprings (continuants of the Old Bulgarian *nt*-stems) are the semantic type of basic nouns that with DIM3 derivatives. Moreover, in Bulgarian even abstract nouns can be diminutivized (see Nitsolova 2009).

5.4.4. Psycholinguistic constraint

Only productive suffixes are used for the formation of DIM2 and DIM3 nouns. Unproductive suffixes don't allow for the attachment of further diminutive suffixes by default.

In sum, Bulgarian has second- and third-grade diminutives. Suffixes that derive DIM2 and DIM3 nouns are phonologically, morphologically and psycholinguisticaly constrained. The basic nouns with which a diminutivization starts are relatively unconstrained.

6. Discussion

Up to now we have established that suffix order in double and multiple diminutives in Polish and Bulgarian is subject to phonological, morphological and psycholinguistic constraints. Moreover, there are formal and semantic constraints operating on basic nouns but in general, diminutivization in Bulgarian appears less constrained than diminutivization in Polish, which can explain why Bulgarian allows for DIM3 nouns.

Intriguingly, the trivial at first sight suffix ordering in Polish and Bulgarian double and multiple diminutives challenges recent affix-order theories. Thus, in this section, we will show how the derivation of diminutives contributes to a better understanding of the mechanisms behind affix ordering and the nature of dimunitivization.

In sections 4 and 5, we presented the Polish and Bulgarian diminutives as derived step-by-step through the attachment of diminutive suffixes to a base. However, there are linguists who have claimed for the opposite (i.e. affix-to-base) direction of morphological derivation. For arguments in favor of affix-to-base derivation of morphological forms, inclusive diminutives, see Melissaropoulou and Ralli (2010) and the discussion and references therein. Linguists assuming affix-to-base morphology claim that an affix takes a more limited number of bases than a base affixes. While Polish and Bulgarian DIM1 nouns seem to confirm this claim, double and multiple

diminutives provide evidence against it, see the combinations of suffixes and bases in table 3 and table 5. Moreover, since in DIM2 and DIM3 nouns the base and the suffix rime, both directions, base-to-suffix and suffix-to-base, appear appropriate for derivation of diminutives in most cases. Thus, Polish and Bulgarian diminutives can be seen as evidence for Manova & Aronoff's (2010) observation (based on purely mathematical reasoning) that both directions of derivation should exist in a language.

Recall now that both languages, Polish and Bulgarian, have relatively rich sets of DIM1 suffixes, of which only a few derive DIM2 nouns, and in Bulgarian also DIM3 nouns. In Bulgarian three suffixes, *-ka*, *-ica* and *-ence,* occur in DIM2 nouns, and of the three suffixes, only *-ica* and *-ence* are then used in DIM3 nouns. In Polish, five suffixes have been observed to occur in DIM2 nouns, however only three of them are productive, *-ek*, *-ka* and *-ko,* and combine with DIM1 suffixes. We have formulated three types of constraints (phonological, morphological and psycholinguistic) that govern the combinations of bases and suffixes[19]. Intriguingly, the three constraints work in conjunction but do not make conflicting predictions (here we ignore the formation of DIM1 nouns). Of all constraints, morphological (fixed) ordering seems the most powerful one, i.e. if one knows the fixed combinations that occur in DIM2 and DIM3 nouns, one will always produce (at least potentially) appropriate diminutives. In other words, always when a morphological rule applies, the selected DIM2 / DIM3 suffix will rime with the base and will be productive. These observations, at the same time, confirm and question the most frequently used theory for affix order analysis in the literature – the Optimality Theory (OT) (Kager 1999). OT works with ranked constraints (which is consonant with our findings) but allows for their violations (which contradicts our observations). It should be noted that violations of constraints are of particular importance to OT, since based on the number of violations, one establishes the most optimal candidate (derivative).

We could formulate a phonological constraint involving suffix length (the number of syllables of a suffix). In Polish only short (monosyllabic) suffixes are added as DIM2 markers whereas in Bulgarian two long suffixes serve for derivation of DIM2 and DIM3 nouns. In the literature, suffix length is a kind of exotic affix ordering criterion and the instances reported so far are primarily from understudied languages (cf. Rice 2011). Thus, with respect to the role of affix length in affix ordering, Polish and Bulgarian double and multiple diminutives make a contribution to morphological theory providing examples from well-studied languages.

Moreover, in Polish and Bulgarian diminutives the growth of the word length implies growth in regularity, compare the formation of DIM1 with that of DIM 2 and DIM 3 nouns in Table 3 and Table 5. The phonological rules deriving DIM2 and DIM3 nouns are without exceptions. The regularity of the phonological rules and the fact that only productive diminutive suffixes occur in DIM2 and DIM3 nouns provide support to psycholinguistic approaches to affix ordering, such as the parsability hypothesis (cf. Hay 2003) and the elaborated on it theory of Complexity-Based Ordering (CBO) (cf. Hay and Plag 2004; Plag and Baayen 2009). Psycholinguistic approaches claim that in

[19] Recall that the semantic constraint operates only on basic nouns.

the word form an affix that is far from the base should be more easily parsable than an affix that is near to the base, and that parsability, among other things, correlates with regularity and productivity. On the other hand, the fact that in diminutives the same suffix can be repeated on adjacent cycles is evidence against CBO, which does not allow repetition of affixes. Thus, Polish and Bulgarian diminutives, at the same time, confirm and challenge psycholinguistic approaches to affix ordering.

The case of suffix permutation found in Bulgarian DIM2 nouns, *-ica* + *-ka* and *-ka* + *-ica*, further challenges CBO, since the latter allows a particular suffix either to precede or follow another suffix, but not both. The Bulgarian DIM2 suffixes in *-a* also show that AB-BA suffix combinations are less exotic than usually assumed in the literature (see the discussion in Caballero 2010). AB-BA order is not typical only for the unstable morphological systems of underdescribed languages but can arise for phonological reasons in any language. In the case of the Bulgarian diminutives, the permutation of the two productive suffixes *-ica* and *-ka* leads to avoidance of repetition of identical morphs, since both *-ica* and *-ka* are eligible DIM2 suffixes. It should be noted here that Manova (2010a) also reports permutations of non-diminutive derivational suffixes in Bulgarian and shows that with respect to suffix permutation, diminutivization behaves like derivational morphology.

However, the phonological (alliterative) rules in diminutive formation we formulated are similar to phonological inflection class assignment rules[20] and alliterative concord in morphosyntax (see Corbett 1991: 117–119). Thus, with respect to phonology, diminutivization lines up with inflection.

In addition, we have established that suffix order in Polish and Bulgarian double and multiple diminutives is not free but fixed, in the sense that the suffixes that derive DIM2 and DIM3 nouns participate in particular combinations only. First, not every diminutive suffix is eligible as DIM2 and DIM3 suffix. Both Polish and Bulgarian have filtered the sets of their DIM1 suffixes and specialized a few suffixes as DIM2. Bulgarian has further filtered the DIM2 suffixes, of which only two can be used as DIM3. Second, the 'chosen' DIM2 and DIM3 suffixes participate in fixed but phonologically predictable (regular) suffix combinations. This organization of the word structure in DIM formations further relates diminutivazation to inflection since it resembles template morphology (cf. Simpson Withgott 1986; Spencer 1991; Stump 1992, 1997, among many others). Template morphology, however, requires an affix to appear in a particular single word slot and to be substitutable by affixes expressing the same category in that slot. Thus, diminutives differ from the classical template morphology since one and the same diminutive suffix may occupy more than one position in the word form, i.e. can be used as DIM1, DIM2 and even as a DIM3 suffix. Naturally, the use of the same suffix in neighboring slots in diminutives is motivated semantically: as is typical of derivational morphology (Dressler 1989, Booij 2000), a diminutive suffix adds semantics each time when it attaches, which explains the repetition of suffixes. However, it is well known that languages tend to avoid repetition of identical morphs. In Polish and Bulgarian, morphonology intervenes and makes

[20] On phonological inflection class assignment in Bulgarian, see Manova 2003.

the identical morphs 'different'. In DIM2 and DIM3 nouns, due to palatalization of the base final consonant, the repeated neighboring suffixes do not look identical in most cases[21], the Bulgarian *-ence* being an exception.

Double and multiple diminutives express a greater degree of smallness (and affection) in comparison to the DIM1 nouns, i.e. DIM2 and DIM3 have compositional semantics, as is typical of layered morphology (Rice 2000: 11). This means that the derivation of the Polish and Bulgarian diminutives is compatible with theories of scopal affix ordering such as Rice (2000) who demonstrates with data from Athapaskan languages that the added suffix usually scopes semantically over the structure it attaches to.

Thus, we can conclude that Polish and Bulgarian diminutives show features of both template (fixed) and layered (step-by-step) morphological organization. This conclusion is against the traditional understanding of affix order as being either templatic or layered but consonant with Manova & Aronoff's (2010) observations about the ways affix ordering works in human languages. In addition, the above-listed peculiarities with respect to suffix order confirm the in-between status of diminutives, between derivation (layered morphology) and inflection (template morphology), in morphological theory.

Finally, Polish diminutives provide evidence that the type of morphological rule applied may be also of importance to affix order. While in Bulgarian all DIM suffixes always attach through addition, in Polish unproductive DIM2 suffixes attach only by substitution, the latter rule being more complex cognitively than addition (Manova 2011). In Polish, unproductive DIM2 suffixes do not participate in combinations with other diminutive suffixes. Maybe due to the fact that affix substitution often results in avoidance of affix combination, the way a suffix attaches has not been considered in the literature on affix ordering so far, at least to the best of our knowledge.

The findings of this study have also consequences for the definition of closing suffixes (Szymanek 2000; Aronoff & Fuhrhop 2002; and Manova 2008, 2009b). Aronoff & Fuhrhop (2002) exclude diminutive suffixes from their investigation of closing suffixes in German because according to these authors diminutive suffixes are closing by definition. As we could see above, only unproductive diminutive suffixes are never followed by other diminutive suffixes, i.e. are closing, while the productive suffixes are terminal but not closing in the classical sense since they can be used recursively on adjacent cycles, i.e. can be followed by themselves. This situation requires a revision of the definition of a closing suffix. A closing suffix should be allowed to attach to itself. Clearly, unproductive diminutive suffixes that can be followed by productive suffixes are not closing.

In sum, the research reported here provides evidence for affix order governed by a set of principles. This is a kind of morphological-phonological ordering supported by a psycholinguistic principle related to suffix productivity. The principles involved in suffix order work in conjunction and none of them is violated in double and multiple diminutives. Nevertheless, morphological ordering (fixed order) appears the most predictive ordering principle, i.e. if we know the fixed combinations of suffixes, we

[21] Cf. the discussion on identical morphs in double diminutives in Polish and Ukrainian in S&D's paper.

will always produce (at least potentially) appropriate DIM2 and DIM3 nouns. The formal and semantic restrictions on the basic nouns are relevant to diminutivization but are not directly involved in the order of the diminutive suffixes. Suffix order in double and multiple diminutives also confirms the in-between status of diminutives – between derivation and inflection – in morphological theory.

7. Conclusion

In this article we have investigated suffix combinations in DIM2 and DIM3 nouns in Polish and Bulgarian. The formation of double and multiple diminutives in both languages is subject to a set of constraints (suffix order principles). Both languages 'filter' their relatively rich sets of DIM1 suffixes and use very few diminutivizers for the formation of DIM2 and DIM3 nouns. The order of suffixes is phonological in the sense that the termination of the base can be used as a predictor of the suffix that attaches to that base. The attachment of the diminutive suffixes can be classified as alliterative suffixation. This is also true of DIM1 suffixes, though to a lesser extent. Additionally, only suffixes that occur in DIM2 nouns can derive DIM3 nouns in Bulgarian. DIM3 nouns are possible, but not typical of Polish. The order of the diminutive suffixes in DIM2 and DIM3 nouns is also morphological, i.e. fixed. Also productivity is relevant to suffix order in diminutives and productive suffixes are external to unproductive ones. Of all the constraints, the morphological one is the most powerful predictor of suffix order in double and multiple diminutives. Due to compositional semantics, suffix repetition is typical of second and third grade diminutives. With respect to the future [+/- closing], not all diminutive suffixes behave in the same way. The suffix order peculiarities in diminutivization provide further evidence for the well-known fact that diminutives share features of both derivation and inflection.

References

Aronoff Mark, Fuhrhop Nanna (2002): Restricting Suffix Combinations in German and English: Closing Suffixes and the Monosuffix Constraint. — *Natural Language and Linguistic Theory* 20, 451–490.

Booij Geert (2000): Inflection and derivation. — [In:] Geert booij, Christian Lehmann, Joachim mugdan (eds.): *Morphology. An international handbook on inflection and word-formation*; Berlin–New York: Walter de Gruyter, 360–369.

Booij Geert (2010): *Construction morphology*. — Oxford: Oxford University Press.

Bulgarian National Corpus, http://dcl.bas.bg/en/corpora_en.html

Caballero Gabriela (2010): Scope, phonology and morphology in an agglutinating language: Choguita Rarámuri (Tarahumara) variable suffix ordering. — *Morphology* 20 (1), 165–204.

Corbett Greville G. (1991): *Gender*. — Cambridge: Cambridge University Press.

Derzhanski Ivan (2005): On Diminutive Plurals and Plural Diminutives. — [In:] Geert Booij, Emiliano Guevara, Angela Ralli, Salvatore Sgroi, Sergio Scalise (eds.): *Morphology and Linguistic Typology*: *On-line Proceedings of the Fourth Mediterranean Morphology Meeting* (MMM4); Catania, 21–23 September 2003, Università degli Studi di Bologna.

Długosz Natalia (2009): *Słowotwórstwo polskich i bułgarskich deminutywów rzeczownikowych*. — Poznań: Wydawnictwo Poznańskie.

Doroszewski Witold, ed. (1997): *Słownik języka polskiego*. Electronic version. — Warszawa: Wydawnictwo Naukowe PWN.

Dressler Wolfgang U. (1989): Prototypical differences between inflection and derivation. — *Zeitschrift für Phonetik, Sprachwissenschaft and Kommunikationsforschung* 42, 3–10.

Dressler Wolfgang U., Mayerthaler Willi, Panagl Oswald, Wurzel Wolfgang U., eds. (1987): *Leitmotifs in Natural Morphology*. — Amsterdam: Benjamins.

Dressler Wolfgang U., Merlini-Barbaresi Lavinia (1994): *Morphopragmatics: diminutives and intensifiers in Italian, German, and other languages*. — Berlin–New York: Mouton de Gruyter.

Dubisz Stanisław, ed. (2008): *Uniwersalny słownik języka polskiego.* Electronic version. —Warszawa: Wydawnictwo Naukowe PWN.

Grabias Stanisław (1981): *O ekspresywności języka. Ekspresja a słowotwórstwo.* — Lublin: Wydawnictwo Lubelskie.

Grzegorczykowa Renata, Laskowski Roman, Wróbel Henryk, eds. (1998): *Gramatyka współczesnego języka polskiego. Morfologia.* — Warszawa: Wydawnictwo Naukowe PWN.

Grzegorczykowa Renata, Puzynina Jadwiga (1979): *Słowotwórstwo współczesnego języka polskiego. Rzeczowniki sufiksalne rodzime*. — Warszawa: Państwowe Wydawnictwo Naukowe.

Gussmann Edmund (2007): *The Phonology of Polish*. — Oxford: Oxford University Press.

Hay Jennifer (2003): *Causes and consequences of word structure*. — London: Routledge.

Hay Jennifer, Plag Ingo (2004): What constrains possible suffix combinations? On the interaction of grammatical and processing restrictions in derivational morphology. — *Natural Language and Linguistic Theory* 22, 565–596.

Jadacka Hanna, ed. (2001): *Słownik gniazd słowotwórczych współczesnego języka ogólnopolskiego. Tom 2: Gniazda odrzeczownikowe.* — Kraków: Universitas.

Jurafsky Daniel (1996): Universal Tendencies in the Semantics of the Diminutive. — *Language* 72 (3): 533–578.

Kager Rene (1999): *Optimality Theory.* — Cambridge: Cambridge University Press.

Kallas Krystyna (2009): O formantach infiksalnych w polskim słowotwórstwie synchronicznym. — *Linguistica Copernicana* 1 (1): 171–181.

Kreja Bogusław (1989): Problem dystrybucji przyrostków deminutywnych *-ek* i *ik*. — [In:] Bogusław Kreja: *Z morfonologii i morfotaktyki współczesnej polszczyzny*; Wrocław: Zakład Narodowy im. Ossolińskich, 25–37.

Kryk-Kastovsky Barbara (2000): Diminutives: An interface of word-formation, semantics and pragmatics. — [In:] Christiane Dalton-Puffer, Nikolaus Ritt (eds.): *Words: Structure, meaning, function. A festschrift for Dieter Kastovsky*; Berlin–New York: Mouton de Gruyter, 165–174.

Langacker Ronald W. (1987): *Foundations of Cognitive Grammar, Vol. I: Theoretical prerequisites.* — Stanford: Stanford University Press.

Manova Stela (2002): Between derivation and inflection: on morphotactic expression of aspect and gender in Bulgarian, Russian and Serbo-Croatian. — *Wiener Slavistisches Jahrbuch* 48, 203–217.

Manova Stela (2003): An input-oriented approach to inflection class assignment illustrated with Bulgarian nominal inflection. — *Wiener Slavistisches Jarbuch* 49, 103–118.

Manova Stela (2005): Derivation versus Inflection in three Inflecting Languages. — [In:] Wolfgang U. Dressler, Dieter Kastovsky, Oskar Pfeiffer, Franz Rainer (eds.): *Morphology and its Demarcations*; Amsterdam–Philadelphia: Benjamins, 233–252.

Manova Stela (2008): Closing suffixes and the structure of the Slavic word: Movierung. Austrian Contributions to the 14th International Congress of Slavists, Ohrid, Macedonia, September 2008. — *Wiener Slavistisches Jahrbuch* 54, 91–104.

Manova Stela (2009a): Restrictions on recursive diminutivization in Slavic. Paper presented at the *Workshop on recursiveness in word-formation. 42 Annual Meeting of the Societas Lingusitica Europaea*, Lisbon, Portugal, September 9–12, 2009.

Manova Stela (2009b): Closing suffixes in Bulgarian, Russian and German: the role of semantics. — [In:] Mónika Farkas Baráthi (ed.): *Bulgarian Language and Literature in Slavic and Non-Slavic Contexts*; http://homepage.univie.ac.at/stela.manova/manova_szeged2009.pdf (22.08.2010).

Manova Stela (2010): Suffix Combinations in Bulgarian: Parsability and Hierarchy-Based Ordering. — *Morphology* 20 (1): 267–296.

Manova Stela (2011): *Understanding Morphological Rules: With Special Emphasis on Conversion and Subtraction in Bulgarian, Russian and Serbo-Croatian.* (= Studies in Morphology 1). — Dordrecht: Springer.

Manova Stela, Aronoff Mark (2010): Modeling Affix Order. — *Morphology* 20 (1): 109–131.

Manova Stela, Egginger Philipp, Winternitz Kimberley (2009): Diminutivierung im Bulgarischen, Russischen und Polnischen: Eine kontrastive Analyse. Paper given at the 37. *Österreichischen Linguistiktagung*, Salzburg, Austria, 5–7. Dec. 2009.

Melissaropoulou Dimitra, Ralli Angela (2010): Greek derivational structures: restrictions and constraints. — *Morphology* 20 (2): 343–357.

Narodowy Korpus Języka Polskiego, www.nkjp.pl

Plag Ingo, Baayen Harald (2009): Suffix ordering and morphological processing. — *Language* 85 (1): 109–152.

Rice Keren (2000): *Morpheme Order and Semantic Scope*. — Cambridge: Cambridge University Press.

Rice Keren (2011): Priciples of affix ordering: an overview. — *Word Structure* 4 (2), 169–200.

Saloni Zygmunt, ed. (2007): *Słownik gramatyczny języka polskiego*. Electronic version. — Warszawa: Wiedza Powszechna.

Scalise Sergio (1984): *Generative Morphology.* — Dordrecht: Foris.

Simpson Jane, Withgott Margaret (1986): Pronominal clitic clusters and templates. — [In:] Hagit Borer (ed.): *The syntax of pronominal clitics*. (= *Syntax and semantics* 19); New York: Academic Press, 149–174.

Skalička Vladimir (1979): *Typologische Studien*, Peter Hartmann (ed.). (= Schriften zur Linguistik 11). — Braunschweig–Wiesbaden: Vieweg.

Spencer Andrew (1991): *Morphological theory*. — Oxford: Blackwell Publishers.

Stump Gregory T. (1992): On the theoretical status of position class restriction in inflectional affixes. — [In:] Geert Booij, Jaap van Marle (eds.): *Yearbook of morphology* 1991; Dordrecht: Kluwer, 211–241.

Stump Gregory T. (1997): Template morphology and inflectional morphology. — [In:] Geert Booij, Jaap van Marle (eds.): *Yearbook of morphology* 1996; Dordrecht: Kluwer, 217–241.

Szymanek Bogdan (2000): On morphotactics: Closing morphemes in English. — [In:] Bożena Rozwadowska (ed.): *PASE Papers in Language Studies*; Wrocław: Aksel, 311–320.

Szymanek Bogdan, Derkach Tetyana (2005): Constraints on the derivation of double diminutives in Polish and Ukrainian. — *Studies in Polish Linguistics* 2, 93–112.

Wierzbicka Anna (1984): Diminutives and depreciatives: Semantic representation for derivational categories. — *Quaderni di Semantica* 5, 123–130.

Андрейчин Любомир, ed. (1975): *Обратен речник на съвременния български език*. — София: Издателство на БАН.

Андрейчин Любомир, Асенова П., Георгиева Е., Иванова К., Иицолова Р., Пашов П., Първев Х., Русинов Р., Станков С., Чолакова К., eds. (1983): *Граматика на съвременния български книжовен език. Том II. Морфология*. — София: Издателство на БАН (reprint In 1998 by Абагар, София.

Зидарова Ваня (2008): Деминутиви и лексикална номинация, http://www.belb.net/personal/zidarova/deminutiva_lex.htm.

Ницолова Руселина (2009): Wortbildung der Deminutiva aus abstrakten Substantiven im Bulgarischen. Paper presented at the *2nd Vienna Workshop on Affix Order*, Vienna, 15–16 June 2009.

Радева Василка (1991): *Българското словообразуване*. — София: Университетско издателство Св. Климент Охрид ски.

Радева Василка (2007): *В света на думите*. — София: Университетско издателство Св. Климент Охридски.

Станков Валентин, ed. (2002): *Нов правописен речник на българския език*. — София: Хейзъл.

Стоянов Стоян (1993): *Граматика на българския книжовен език*. — София: Университетско издателство „Св. Климент Охридски".